

CLAIMS

What is claimed is:

1. A component comprising:
  - a) a first structure;
  - 5 b) a second structure that is integrated with the first structure; wherein the first structure is a balanced to unbalanced circuit (balun) and the second structure is a filter.
- 10 2. The component of claim 1 wherein the balun is for one of moving a signal from a differential form to a single ended form and moving a signal from a single ended form to a differential form.
- 15 3. The component of claim 1 wherein the first structure acts as a substrate for the second structure, and the filter is mounted on top of the balun.
4. The component of claim 1 wherein the filter is a resonator-based filter.
- 20 5. The component of claim 1 wherein the filter includes a single-ended input and a single-ended output.
6. The component of claim 5 wherein the filter is implemented with a half-ladder resonator-based filter.
- 25 7. The component of claim 1 wherein the filter includes differential inputs and differential outputs.

8. The component of claim 7 wherein the filter is implemented with one of a full-ladder resonator-based filter and a lattice resonator-based filter.

5 9. The component of claim 1 wherein the balun is implemented with at least two transmission lines.

10. The component of claim 1 wherein the balun is implemented with lumped elements that include inductors and capacitors.

10 11. The component of claim 10, wherein the component includes input ports and output ports, the component further comprising at least two elements for performing impedance transformation at the input ports and at the output ports.

15 12. The component of claim 4, wherein the resonator-based filter is one of a filter that is implemented with film bulk acoustic resonators (FBARs) or a filter that is implemented with surface acoustic wave (SAW) technology.

20 13. A component comprising:  
a) a filter that includes a single ended input and a single ended output;  
b) a balanced to unbalanced circuit (balun) that includes a single ended port and a differential port;  
25 wherein the balun is integrated with the filter.

14. The component of claim 13 further comprising a single ended input, a differential output, a first stage, and a second stage coupled to the first stage;

wherein the filter is in the first stage;

5 wherein the single ended input of the filter is coupled to the single ended input of the component;

wherein the balun is in the second stage;

wherein the single ended port of the balun is coupled to the singled ended output of the filter; and

10 wherein the differential port of the balun is coupled to the differential output of the component.

15. The component of claim 13 further comprising a differential input, a single ended output, a first stage, and a second stage coupled to the first stage;

wherein the balun is in the first stage;

wherein the differential port of the balun is coupled to the differential input of the component;

wherein the filter is in the second stage;

20 wherein the single ended input of the filter is coupled to the single ended port of the balun; and

wherein the single ended output of the filter is coupled to the single ended output of the component.

16. The component of claim 13

wherein the filter is one of a resonator-based filter, a filter that is implemented film bulk acoustic resonators (FBARs), and a filter that is implemented with surface acoustic wave (SAW) technology; and

5 wherein the balun is implemented with one of at least two transmission lines and lumped elements that include inductors and capacitors.

17. A component comprising:

- 10 a) a filter that includes a differential input and a differential output;  
b) a balanced to unbalanced circuit (balun) that includes a single ended port and a differential port;  
wherein the balun is integrated with the filter.

15 18. The component of claim 17 further comprising a single ended input, a differential output, a first stage, and a second stage coupled to the first stage;

wherein the balun is in the first stage;

20 wherein the single ended port of the balun is coupled to the single ended input of the component;

wherein the filter is in the second stage;

wherein the differential input of the filter is coupled to the differential port of the balun; and

25 wherein the differential output of the filter is coupled to the differential output of the component.

19. The component of claim 17 further comprising a differential input, a single ended output, a first stage, and a second stage coupled to the first stage;

wherein the filter is in the first stage;

5 wherein the differential input of the filter is coupled to the differential input of the component;

wherein the balun is in the second stage;

wherein the differential port of the balun is coupled to the differential output of the filter; and

10 wherein the single ended port of the balun is coupled to the single ended output of the component.

20. The component of claim 17

wherein the filter is one of a resonator-based filter, a filter that is  
15 implemented film bulk acoustic resonators (FBARs), and a filter that is implemented with surface acoustic wave (SAW) technology; and

wherein the balun is implemented with one of at least two transmission lines and lumped elements that include inductors and capacitors.